

# RoadTalk

Ontario's Transportation Technology Transfer Digest • May 2004 • Vol 10 Issue 2

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## France-Ontario Innovative Technologies Exchange Conference Building Communications Between Countries



Reciprocal Driver's License Agreement signed by the Hon. Harinder Takhar (right), Ontario Minister of Transportation, and the Hon. Dominique Bussereau, French Minister of Transport.

The France-Ontario Innovative Transit and Transportation Technologies Conference was held in Toronto on December 1st-2nd, 2003. The conference assembled public and private sector professionals from Ontario and France for an exchange of information, ideas and expertise in urban transit, highway planning and design, and high-technology transportation applications. The event was planned and managed in partnership by the Ontario Ministry of Transportation, the French Economic Commission in Toronto, the French Ministry for Infrastructure, Transport, Tourism and the Sea, Ontario Exports Inc., Canadian Urban Transit Association, the Toronto Transit Commission, GO Transit, Alcatel, Ubifrance, the City of Toronto and Intelligent Transportation Systems (ITS) Canada. The participants heard presentations on major

transit and highway infrastructure projects, intelligent transportation systems and public-private partnerships in both Ontario and France.

Ten French companies and five government officials from France interacted with over twenty-five Ontario companies, representatives from seven transit authorities, five associations, York University research institute, the City of Toronto and Ontario's Ministry of Transportation, Ministry of Economic Development & Trade and Ministry of Public Infrastructure Renewal, as well as representatives from Transport Canada.

Through a series of workshops and one-on-one meetings, attendees reviewed the latest French technology and expertise in transit and transportation. Presentation highlights from French delegates included:

- A toll road in Paris that separates >

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**A massive washout on Highway 11 at Price Creek  
See page 7**

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**T**he results of a field trial conducted in July 2003 by MTO's Materials Engineering and Research Office in collaboration with Ryerson University are breaking new ground for an innovative curing method that facilitates more durable bridge repairs.

MTO uses silica-fume shotcrete for bridge soffit repairs. Shotcrete is a concrete-like material that is sprayed onto a surface at high pressure. Silica-fume is a mineral admixture that improves concrete properties such as bonding strength, freeze/thaw resistance and permeability. Shotcrete must be properly cured to develop into a strong and impermeable layer to protect bridge reinforcement and a moist environment must be created around the freshly applied shotcrete layer to ensure proper hydration of its components in the first few days after placement.

Silica-fume shotcrete demands more curing care than traditional concretes, as it may shrink and crack if not properly treated. Surface cracks lead to the accelerated corrosion of the bridge's steel reinforcement, as both water and salt can penetrate the protective shotcrete layer. Silica-fume shotcrete must be cured by adding water. This is best accomplished on overhead bridge structures through the application of a fog-mist over a 7-day period. Misting produces optimal curing, but is generally not done on bridge soffits over busy 400-series highways due to strict lane-closure restrictions. A spray-applied curing compound is used instead, which prevents moisture loss but fails to replenish water in the hydrating mix.

MTO recently investigated a new method to achieve proper moist curing that does not entail lane closures or ongoing access to the concrete surface: the application of wet-sprayed cellulose.

Wet-sprayed cellulose is essentially the same product widely used for thermal and acoustic insulation, consisting of layers of paper-based fibres saturated with glue and water, sprayed as an adhesive coating on freshly applied shotcrete. Prior to the field trial, it was theorized that the ability of cellulose to retain moisture would make it an effective curing agent, as it would share moisture with the shotcrete layer upon application. This concept was originated by Concrete Section's Senior Concrete Engineer Jana Konecny, and a trial project was launched under the direction of Tom Klement, Senior Research Engineer.

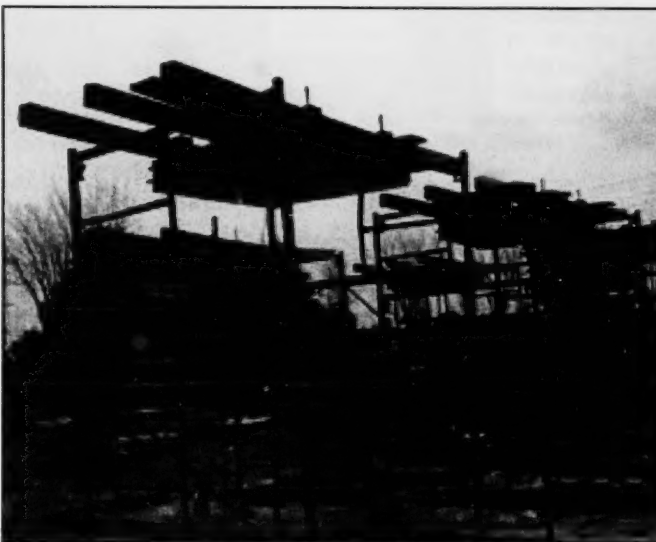
Enthusiastic private sector involvement contributed to the success of the trial. Two cellulose companies provided their services at no cost to MTO, while Underground Services (1983) Ltd. agreed to facilitate the

trial at their company compound in Thorold at reduced cost.

The trial was conducted in cooperation with a civil engineering research team from Ryerson University, led by Professor Medhat Shehata, under MTO's Highway Infrastructure Research and Innovation Grant Program.

"The trial allowed our students to gain practical field experience and make a real contribution to the transportation industry, while MTO received the benefit of their determined research efforts," commented Professor Shehata.

The purpose of the field trial, initiated on July 10th, 2003, near the Thorold Tunnel in Niagara Falls, was to determine if cellulose curing could function as an effective alternative to curing compounds and fog misting. The trial simulated bridge repair conditions and involved the creation of nine test panels suspended on a scaffold sys-



The suspended shotcrete test panel.

tem and sprayed with silica-fume shotcrete. Panel one was air-cured, panel two was sealed with a curing compound and panel three was mist-cured. Panels four through six were sprayed with a cellulose mix provided by an Ontario-based company, while panels seven through nine were sprayed with a cellulose product produced by a U.S. company. The panels were suspended for 28 days, after which the cellulose layers (still in a moist state) were scraped off and cores taken from each panel for testing at Ryerson labs.

As expected, the panels cured with air and curing compound exhibited significant shrinkage and cracking around the panel perimeter. The mist-cured panel had no visible cracks, reaffirming the fact that mist curing is the most desirable, yet the least

## Curing Silica-fume Shotcrete Wet-sprayed Cellulose Improves Bridge Repairs

practical, curing method. Ontario cellulose material, engineered for home insulation, required on-site experimentation with different adhesive content to achieve an optimum mix. Only one out of three such panels fully retained the cellulose and showed no evidence of shrinkage cracking. All three panels cured with the U.S. cellulose material retained all of the

applied cellulose and experienced no visible cracking.

The Ryerson team assembled a conclusive body of results by April 2004. Various tests measured the strength, permeability and porosity of the core samples. Results indicate that cellulose curing is as effective as mist curing, and is considered superior to conventional curing compounds. Cellulose curing offers a cost-effective alternative to mist curing, and allows for the re-opening of traffic lanes almost immediately after

repair completion.

MTO's Concrete Section plans to conduct pilot projects in which cellulose curing will be applied to active bridge structures. Specifications for optimum performance will be developed from these trials. Once specifications are finalized, the curing of silica-fume shotcrete with wet-sprayed cellulose can be implemented in stages throughout Ontario.

MTO's shotcrete repair program is expected to benefit from the use of cellulose curing, as the long-term implementation of this method offers the possibility of improving the cost-savings and effectiveness of bridge soffit repairs. •

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# Asset Management Update

## Performance Measures Critical for Business

**P**erformance measures are the backbone of any asset management framework in both public agencies and private businesses. Performance measures are a critical business tool used to report successes and opportunities for improvement to customers, shareholders and employees. They are also used to evaluate the state of assets and to develop future business plans.

A set of performance measures is being developed within the Asset Management Business Framework (AMBF) project. This will allow MTO to report on the following:

- Core business goals and outcomes/results
- Multi-year targets
- Annual commitments and achievements

Measures are driven by two areas, technical needs and corporate goals.

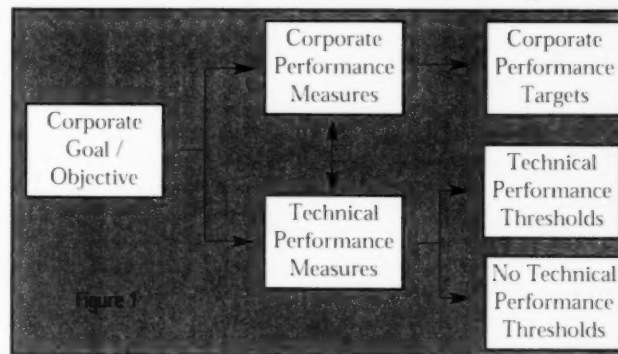
As shown in Figure 1, a corporate goal will drive the need for a technical measure. For example, a corporate goal is to ensure that our assets are in a good state of repair. To establish this, a corporate performance measure is defined as percent of highways in good condition. In order to gauge the performance of an asset, a technical measure is used, in this case the Pavement Condition Index (PCI). The PCI is a value between 0 and 100, which defines the condition of pavement based on the roughness of the ride and the amount and severity of distresses (e.g. cracking) on the pavement. A threshold is a level of the measure that defines the state of the asset; these levels can generally be interpreted as good, fair

or poor. Finally, corporate goals can be quantified to state what target must be met.

The AMBF team is currently considering performance measures under the following categories:

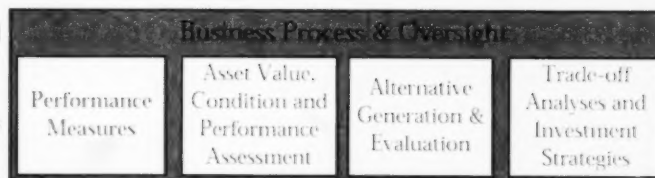
- Asset Preservation

This will include the percent of highways or bridges in good condition, the remaining life of an asset, and asset value.



- Cost Efficiency and Control

This area will measure how well the ministry controls its budgets.



- Customer Satisfaction

This measure is becoming popular with various transportation agencies and includes surveys of the travelling public.

- Economic Development

Although it is known that good highways and transportation systems contribute to the economic competitiveness of the province/community, it is difficult to measure the amount that is attributable to a new/improved highway versus other economic factors such as interest rates.

Measures such as trucking-costs/tonne-km are also a measure of how well highways contribute to the economy.

- Institutional Effectiveness

This is a measure of how well assets are managed over the long term.

Considerations include: what is the cost of doing work now versus delaying the work, and what benefits, in terms of road user costs, are obtained from improvements made to a roadway?

This measure also involves consideration of the Infrastructure Debt Index (see Road Talk, February 2004).

- Modal Integration

These measures will include a percentage increase in transit ridership

and reduced travel time. Modal integration is also a function of social trends, lifestyle and employment patterns.

- Operational Efficiency and Reliability

This measure is crucial, as it allows

the ministry to determine where work is required to decrease roadway congestion. Travel time reliability is an example of this type of measure. This measure is important to both drivers and industries that move goods along the highway. It does not necessarily mean that a driver can travel faster through congested areas; rather, it is aimed at

providing a more accurate idea of congestion conditions (e.g. a driver knows that it will take an hour plus or minus 10 minutes, not an hour plus or minus 45 minutes, to travel a certain route).

- Safety

Various measures are being reviewed, including the potential for accidents and the number and severity of accidents.

The development of a performance measure must satisfy certain conditions: the measure must be assessed simply and consistently, the performance must be under the ministry's control, and it must be easily understood by the audience. •

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**C**onstruction projects and certain maintenance activities initiated by the Ontario Ministry of Transportation (MTO) require that pavement markings be removed and/or repainted to maintain safe road delineation for Ontario drivers. Markings that are no longer applicable or no longer define the path of travel must be removed, masked or obliterated as soon as practical. MTO recently assessed a new ultra high-pressure water blast line removal technology that promises to enhance pavement marking removal operations.

Traditionally, markings are removed by soda-blasting or grinding. Soda-blasting is the most commonly used technique in which markings are broken loose by high pressure sodium bicarbonate (baking soda). While this method is effective and environmentally safe, it can be a noisy and

time-consuming process that may cause pavement scarring. Furthermore, soda-blasting is not useful for removing durable marking materials such as thermoplastic. Grinding, in which rotating steel cutters dig up the pavement surface and markings, is the more cost-effective of the two line removal methods, but has a high potential to damage road surfaces. It should be noted that different methods are selected for each removal operation based on a number of factors, including the length of removal required, noise pollution, the time available for lane closures, the surrounding environment and cost issues.

MTO's Maintenance Office, in conjunction with the Materials Engineering and Research Office, recently had the opportunity to evaluate a new method with the potential to improve long-line removal operations: ultra high-pressure water blast technology. A contractor licensing this technology approached MTO in the fall of 2003 and trial demonstrations were scheduled for October 2003 to determine if this technology would be appropriate for use on MTO projects.

The water blast system, developed by the U.S.-based NLB Corporation, is new to Canada but has been used with great success in most American states. The system consists

of a nozzle assembly device mounted to the front of a truck carrying a high-capacity water tank, vacuum recovery system and pumping unit (the truck may also tow an additional water supply). The mobile nozzle assembly, with adjustable speed and positioning options, follows lane markings and bombards the surface with extremely high-pressured water, effectively removing both typical and durable pavement markings. Water blasting offers a number of advantages over



The complete truck-mounted water blast system: portable water tank, pumping unit, vacuum recovery system and mobile nozzle assembly.

soda-blasting and grinding, the primary benefit being that it leaves the surface intact and unharmed. Furthermore, the system is environmentally safe, quiet, fast and efficient, requires only one operator, features simple controls, and also makes use of a vacuum recovery system to collect water and debris. Most water blast removals require only a single pass to produce a clean, dry road surface ready for repainting. The time requirements for water blast removal are comparable to grinding and superior to soda-blasting. Water blasting serves as an effective supplement to current removal methods, and is ideal for long-line projects.

The demonstrations took place on October 23-24th, 2003, at three locations: the MTO facility on Arrow Road in Toronto, MTO's pavement marking test deck on Highway 401 in Belleville, and on the Avenue Road off-ramp on the 401 westbound Collector lanes. The Arrow Road and Belleville trials took place during the day, and used the water blast technology to remove lane lines from asphalt and concrete. The equipment removed markings at a rate of 10-17 m/minute, and successfully removed 95-100% of paint and thermoplastic markings without any significant surface damage.

## Water Blast Pavement Technology

# High-pressure Water Speeds Markings Removal

Representatives from various MTO offices who attended the demonstration were impressed by the efficiency of the operation and the effectiveness of the vacuum recovery system.

"I feel confident that the performance of this water blast system will make it an excellent addition to MTO's Designated Sources for Materials (DSM) list for long-line removal operations," said Vic Ozyntchak, Maintenance Officer.

The Avenue Road night trial, which involved the removal of a solid line down the middle of an off-ramp, produced similar results. Soda-blasting, which typically takes 3-4 hours to complete, was originally planned for use in this operation. The water blast technology removed the entire 250m line in only 40 minutes.

"Due to the low cost, and quick, clean removal of water blasting, I would recommend that this method be used as much as possible," commented Tyler Neill, Contract Control Officer in charge of the Avenue Road demonstration.

Upon review of the trials, the NLB product was found to exhibit high-quality performance capable of advancing MTO's long-line removal projects, making them more efficient and cost-effective. On January 19, 2004, the product was added to the Ministry's DSM list, authorizing it for use on highway contracts throughout Ontario. The Maintenance Office is currently arranging for the demonstration of other high-pressure water blast systems to add to the DSM for future implementation. •

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## Amethyst Award for 417 Team Bridges Win

The Ontario Ministry of Transportation (MTO) prides itself on employing consummate professionals in the fields of structural engineering, environmental planning, and individuals who enhance construction projects through innovative and creative design. For several years Road Talk has published a series of articles detailing the progress and completion of a challenging contract that demanded the skill, creativity, and innovation from a team of MTO professionals: the construction of twin bridge structures carrying Highway 417 across the Mississippi River in Ottawa Valley. It is with great pride that we announce the 417 team's recent acceptance of a 2002 Amethyst Award for outstanding achievement in the service of the Ontario public.

Ontario Premier Dalton McGuinty presented the award to members of the 417 team at the Amethyst Award ceremony on April 21st, 2004. The ceremony took place at Toronto's Winter Garden Theatre and was attended by recipients from various government ministries. Amethyst Awards are granted annually by the Ontario Ministry of Citizenship and Immigration in recognition of exceptional work by members of the Ontario Public Service. "In constructing this significant bridge across the Mississippi River, the project team overcame a number of environmental, seismic and structural challenges, addressing each one in a way that set a standard for engineering undertakings within and beyond Ontario's borders," commented Carl Hennessey, MTO Assistant Deputy Minister of Operations.

The Highway 417 bridge project was launched in the fall of 2001, in response to increasing traffic volumes and collisions on Highway 17, a segment of the TransCanada Highway running westerly through the Ottawa Valley, near Arnprior. The project team faced a difficult task, as the Mississippi River wetland, a location defined by a number of environmental and geological obstacles, was determined to be the only viable construction site. The wetland featured a diverse fish and reptile habitat; therefore, the team needed to devise a structure that would minimize disturbance to this sensitive ecosystem. Furthermore, construction was complicated by the site's weak, compressible clay soils and a problematic floodplain on the river's east bank. The crossing site was also identified as having

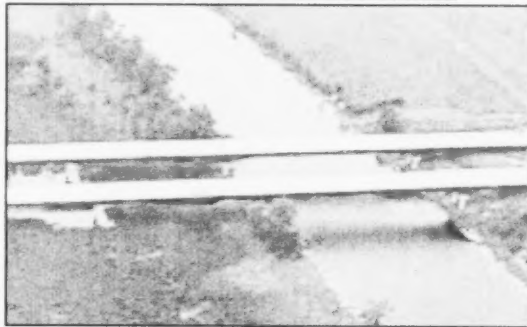
the highest seismic zone classification in Ontario. This challenged the design team to develop a structure able to withstand severe seismic forces.

Through preliminary and detail design phases, the team developed effective solutions to the various challenges. The initial research and planning stages involved cooperation from a number of organizations.

"Our clients included the Federal Government, many provincial agencies, the Friends of the Mississippi River Wetlands, and the general public," explained Phil Pawliuk, Area Engineer. "Public Involvement Centers were held at key stages to allow the local farming community, general public and other agencies to participate in both the planning and design phases of this project."

Several design innovations allowed the twin bridges to co-exist with the wetland ecosystem.

**Members of the 417 Team: Dave McAvoy, Environmental Planner; Louis Tay, Senior Project Engineer; Nicolas Theodor, Senior Structural Design Engineer; Tony Sanguilano, Foundations Engineer; Chris Kardassis, Senior Designer; Barry McQuay, Senior Designer; Phil Pawliuk, Area Engineer; Gordon Bell, Supervisor, Environmental Unit; Ken Polson, Area Construction Maintenance Engineer; Felipe Mendoza, Contract Control Officer; Paul Ireland, Quality Assurance Officer; Frank Pinder, Head, Quality Assurance.**



The twin Mississippi River Bridges carrying Highway 417 over the Mississippi River wetland in Ottawa Valley.

Bridge piers, minimized both in number and size, were constructed outside of the river to allow for an undisturbed fish habitat. Several construction measures were taken to compensate for habitat loss and enhance the existing diversity of the wetland (see Road Talk, August 2000). These measures included an aesthetic thin deck design which allowed for a lighter structure and improved shading effects on wetland vegetation; a structural design which preserved water quality by diverting deck drainage to a water management

facility; and a deck height facilitating both wildlife movement and recreational trail use below the bridge. Bridge construction was aided by the creation of a unique temporary access road, composed of rock layers and plastic mesh, which effectively "floated" across the organic layer of wetland with minimal environmental disturbance. The final bridge incorporated an innovative design that left no significant footprint on the Mississippi River wetland. Construction of key bridge elements was scheduled for the fall and winter to minimize effects on aquatic wildlife and migratory birds.

The project team compensated for soil deficiencies by increasing the planned bridge length, and by making use of lightweight fill materials and wick drains (plastic cores that draw water from the soil in construction). These methods controlled the settlement of bridge approach embankments and reduced the pressure applied to layers of surface clay (see Road Talk, November 2001).

Lastly, the team's creative efforts compensated for the seismic site conditions by incorporating dynamic isolation bearings technology (see Road Talk, May 2001). This design method distributes seismic pressures to multiple substructure units, making the bridge resistant to strong earthquake forces. The team developed a unique hybrid of available systems in order to meet the specific requirements of the Mississippi River site.

"With the cooperation of all parties involved we were able to construct a safe and economic structure while minimizing environmental impacts," said Nicolas Theodor, Senior Structural Design Engineer.

The twin bridges, completed in May 2002 (see Road Talk, August 2002), stand as a testament to the unsurpassed skill and ingenuity of the 417 team. Through cooperation, thorough analysis and original design concepts, the team was able to erect a structure that serves as a key transportation link to Ontario drivers while preserving and enhancing the natural environment. The Mississippi River project exemplifies MTO's dedication to environmental sustainability and transportation innovation. Congratulations to the 417 team for this tremendous accomplishment! •

For information, contact Phil Pawliuk, Area Engineer, (613) 545-4661, [Phil.Pawliuk@mto.gov.on.ca](mailto:Phil.Pawliuk@mto.gov.on.ca), or Louis Tav, Field Services Engineer, 613-748-5280, [Louis.Tav@mto.gov.on.ca](mailto:Louis.Tav@mto.gov.on.ca)

The 49th Parallel Storm of 2002 was widely recognized as the worst storm to hit Ontario's Northwestern Region (NWR) in over 100 years. A downpour that began on June 9, 2002, flooded nearly 15,000 square kilometres of provincial territory, disrupting communications, damaging roadways and flooding key travel routes. As more than ten municipalities were declared disaster areas, MTO's Flood Response Team worked tirelessly to provide emergency relief and restore the devastated highway infrastructure. The NWR Response Team, whose efforts led to the safe and efficient management of this crisis, were recently awarded a 2002 Amethyst Award in recognition of their service to a public in need.

The April 21st, 2004, Amethyst Award ceremony took place at Toronto's Winter Garden Theatre. Ontario Premier Dalton McGuinty and Cabinet Secretary Tony Dean presented the award to four MTO field coordinators representing the Response Team: Doug Flegel, Randy Noga, Doug McIntyre and Toby Vennechenko.

"The dedicated efforts of our field coordinators were outstanding," said Carl Hennum, MTO Assistant Deputy Minister of Operations. "Their work and personal sacrifices exemplified both the government's and individual public servant's ability to deal effectively and compassionately with major disasters."

The 49th Parallel Storm caused extensive flooding in the Fort Frances, Atikokan, Kenora, Rainy River, and Dryden areas. The storm produced more than 300mm of rainfall over a three-day period, impacting the region's social and economic infrastructure. Thirteen provincial highways, spanning more than 1000 km, were cut off by washouts and rising floodwaters. Highway closures caused the costly re-direction of commercial and public traffic routes. Communities became increasingly isolated as storm conditions cut power and telecommunications lines; many beaver dams, culverts and bridges were destroyed; water and sewage systems flooded, and several motorists and tourists became stranded as rising rivers flooded highways.

The Ministry reacted immediately to the crisis, organizing a dedicated effort from a large cross-section of government employees in Northwestern Ontario. More than 50 members of the Response Team coordinated efforts to assess damages, repair roads and bridges, reopen highways, rescue trapped tourists, restore communications, and provide guidance to travellers. The highway network was restored in a timely manner. There were constant information exchanges with the Ontario Provincial Police to coordinate safe road management.

The relief efforts directed by the four representing field co-ordinators exemplify the dedication and achievement of the entire Flood Response Team.

Toby Vennechenko, Emo Maintenance Coordinator, supervised over 100 staff and 80 pieces of equipment at the height of the crisis. His team successfully and swiftly re-opened highways, addressed public safety concerns and restored washed out culverts and roads.

"I was truly impressed with the dedication of my staff," said Vennechenko. "They put in extremely long days and worked several weekends without any time off."



Representing members of the Flood Relief Team (from left to right): Doug Flegel, Randy Noga, Doug McIntyre and Toby Vennechenko.

Nickle Lake Maintenance Coordinator Doug McIntyre demonstrated incredible resourcefulness by directing several relief projects via satellite telephone from an area isolated by a washout at Price Creek. McIntyre and his staff organized contractors to open flooded roads, ordered and distributed equipment, and managed repair vehicles at various locations.

Bridge and Facilities Services Coordinator Randy Noga oversaw the

## Award for NWR Flood Relief Flood Response Team Wins Amethyst

construction of a temporary Bailey bridge over a washed-out section of Highway 11 at Price Creek. Noga motivated his staff through long hours, severe weather and an 8-day construction period, completing the bridge and re-opening this key transportation link in record time.

Doug Flegel, Thunder Bay District Electrical Services Coordinator, assembled, maintained and ensured the operation of new solar-powered traffic signals and variable message signs installed at the Highway 11 bridge site. Flegel dedicated countless hours to the project and dealt with multiple equipment failures.

"I would like to recognize and extend immense appreciation to more than 100 unsung heroes in MTO's Northwestern Region who worked diligently behind the scenes," expressed Regional Director Larry Lambert. "These dedicated public servants worked without fanfare to order materials, negotiate with contractors, monitor weather, repair vehicles, and respond to phone calls from flood-affected residents and other public bodies."

The Flood Response Team's commendable relief efforts demonstrate the Ministry's incredible devotion to public service in times of crisis. •

For information, contact Larry Lambert, Regional Director, (807) 473-2050, [Larry.Lambert@mto.gov.on.ca](mailto:Larry.Lambert@mto.gov.on.ca), or Ken Mossop, Maintenance Engineer, (807) 473-2045, [Ken.Mossop@mto.gov.on.ca](mailto:Ken.Mossop@mto.gov.on.ca)

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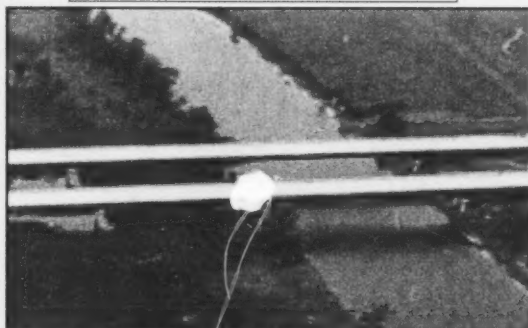
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The project team compensated for soil deficiencies by increasing the planned bridge length, and by making use of lightweight fill materials and wick drains (plastic cores that draw water from the soil) in construction. These methods controlled the settlement of bridge approach embankments and reduced the pressure applied to layers of surface clay (see Road Talk, November 2001).

Lastly, the team's creative efforts compensated for the seismic site conditions by incorporating dynamic isolation bearings technology (see Road Talk, May 2001). This design method distributes seismic pressures to multiple substructure units, making the bridge resistant to strong earthquake forces. The team developed a unique hybrid of available systems in order to meet the specific requirements of the Mississippi River site.

"With the cooperation of all parties involved we were able to construct a safe and economic structure while minimizing environmental impacts," said Nicolas Theodor, Senior Structural Design Engineer.

The twin bridges, completed in May 2002 (see Road Talk, August 2002), stand as a testament to the unsurpassed skill and ingenuity of the 417 team. Through cooperation, thorough analysis and original design concepts, the team was able to erect a structure that serves as a key transportation link to Ontario drivers while preserving and enhancing the natural environment. The Mississippi River project exemplifies MTO's dedication to environmental sustainability and transportation innovation. Congratulations to the 417 team for this tremendous accomplishment! •

For information, contact Phil Pawliuk, Area Engineer, (613) 545-4661, Phil.Pawliuk@mto.gov.on.ca, or Louis Tay, Field Services Engineer, 613-748-5280, Louis.Tay@mto.gov.on.ca

The 49th Parallel Storm of 2002 was widely recognized as the worst storm to hit Ontario's Northwestern Region (NWR) in over 100 years. A downpour that began on June 9, 2002, flooded nearly 15,000 square kilometres of provincial territory, disrupting communications, damaging roadways and flooding key travel routes. As more than ten municipalities were declared disaster areas, MTO's Flood Response Team worked tirelessly to provide emergency relief and restore the devastated highway infrastructure. The NWR Response Team, whose efforts led to the safe and efficient management of this crisis, were recently awarded a 2002 Amethyst Award in recognition of their service to a public in need.

The April 21st, 2004, Amethyst Award ceremony took place at Toronto's Winter Garden Theatre. Ontario Premier Dalton McGuinty and Cabinet Secretary Tony Dean presented the award to four MTO field coordinators representing the Response Team: Doug Flegel, Randy Noga, Doug McIntyre and Toby Vennechenko.

"The dedicated efforts of our field coordinators were outstanding," said Carl Hennum, MTO Assistant Deputy Minister of Operations. "Their work and personal sacrifices exemplified both the government's and individual public servant's ability to deal effectively and compassionately with major disasters."

The 49th Parallel Storm caused extensive flooding in the Fort Frances, Atikokan, Kenora, Rainy River, and Dryden areas. The storm produced more than 300mm of rainfall over a three-day period, impacting the region's social and economic infrastructure. Thirteen provincial highways, spanning more than 1000 km, were cut off by washouts and rising floodwaters. Highway closures caused the costly re-direction of commercial and public traffic routes. Communities became increasingly isolated as storm conditions cut power and telecommunications lines; many beaver dams, culverts and bridges were destroyed; water and sewage systems flooded, and several motorists and tourists became stranded as rising rivers flooded highways.

The Ministry reacted immediately to the crisis, organizing a dedicated effort from a large cross-section of government employees in Northwestern Ontario. More than 50 members of the Response Team coordinated efforts to assess damages, repair roads and bridges, reopen highways, rescue trapped tourists, restore communications, and provide guidance to travellers. The highway network was restored in a timely manner. There were constant information exchanges with the Ontario Provincial Police to coordinate safe road management.

The relief efforts directed by the four representing field co-ordinators exemplify the dedication and achievement of the entire Flood Response Team.

Toby Vennechenko, Emo Maintenance Coordinator, supervised over 100 staff and 80 pieces of equipment at the height of the crisis. His team successfully and swiftly re-opened highways, addressed public safety concerns and restored washed-out culverts and roads.

"I was truly impressed with the dedication of my staff," said Vennechenko. "They put in extremely long days and worked several weekends without any time off."



Representing members of the Flood Relief Team (from left to right): Doug Flegel, Randy Noga, Doug McIntyre and Toby Vennechenko.

Nickle Lake Maintenance Coordinator Doug McIntyre demonstrated incredible resourcefulness by directing several relief projects via satellite telephone from an area isolated by a washout at Price Creek. McIntyre and his staff organized contractors to open flooded roads, ordered and distributed equipment, and managed repair vehicles at various locations.

Bridge and Facilities Services Coordinator Randy Noga oversaw the

## Award for NWR Flood Relief Flood Response Team Wins Amethyst

construction of a temporary Bailey bridge over a washed-out section of Highway 11 at Price Creek. Noga motivated his staff through long hours, severe weather and an 8-day construction period, completing the bridge and re-opening this key transportation link in record time.

Doug Flegel, Thunder Bay District Electrical Services Coordinator, assembled, maintained and ensured the operation of new solar-powered traffic signals and variable message signs installed at the Highway 11 bridge site. Flegel dedicated countless hours to the project and dealt with multiple equipment failures.

"I would like to recognize and extend immense appreciation to more than 100 unsung heroes in MTO's Northwestern Region who worked diligently behind the scenes," expressed Regional Director Larry Lambert. "These dedicated public servants worked without fanfare to order materials, negotiate with contractors, monitor weather, repair vehicles, and respond to phone calls from flood-affected residents and other public bodies."

The Flood Response Team's commendable relief efforts demonstrated the Ministry's incredible devotion to public service in times of crisis.

For information, contact Larry Lambert, Regional Director, (807) 473-2050, [Larry.Lambert@mto.gov.on.ca](mailto:Larry.Lambert@mto.gov.on.ca), or Ken Mossop, Maintenance Engineer, (807) 473-2045, [Ken.Mossop@mto.gov.on.ca](mailto:Ken.Mossop@mto.gov.on.ca)

# Longitudinal Joint Compaction Improving Paved Lanes

The Ontario Ministry of Transportation (MTO) is constantly working to produce superior roads for Ontario drivers. In 1997, MTO's Bituminous Section initiated a series of trials with the intent of improving the quality of longitudinal joint construction in the paved lanes of the provincial highway system. The results of these trials have led to a recent proposal for new contract specifications aimed at improving province-wide paving standards.

The quality of contractor work at longitudinal joints is a recurrent problem for the Ministry. The compaction (density) of joints is often poor due to the inadequacy of current pavement construction methods. Contractors use pavers to lay hot mix material, followed by roller equipment that compacts the hot mix to appropriate densities to produce a durable roadway. Hot mix that is not paved against an existing lane edge spreads outward in response to the roller pressure — this can result in lower density at edges. Poor compaction can also occur at pavement joints that are confined by an existing edge due to an insufficient amount of hot mix material at the joint to allow for proper compaction. Over time, the poor quality of longitudinal joints causes accelerated deterioration. Pavement materials ravel away and potholes and cracking form on the surface at the longitudinal joints, resulting in increased maintenance and reduced driving comfort for motorists.

Currently, MTO contracts do not require compaction testing at longitudinal joints within the 250mm strip alongside the paving lane. This often results in the production of substandard pavements.

The 1997 trials represented a new paving initiative, an attempt to prove that quality work could be achieved at longitudinal joints. The long term goal was the removal of the provision that excluded joint compaction testing from paving contracts.

Four trials of longitudinal joint compaction took place on the surface course of the QFW westbound lanes from Casablanca Blvd. to Fruitland Road. Section one served as a control; longitudinal joints were constructed using normal paving and compaction equipment and techniques. The second section used Joint Match Heater™ equipment in an attempt to create a better joint by heating the edge of the previously laid pavement. The third section was treated with another company's Joint Maker™ System, using compactor and kicker plates to profile and compact edges, and an electronic edge following device to aid

determined the joints to be performing excellently with no cracking or defects evident.

Since the completion of the trials, a special provision for joint compaction was developed and applied to 12 MTO contracts to date. This provision temporarily altered MTO specifications and presented contractors with incentives and disincentives to encourage proper longitudinal joint compaction. The contractor was paid based on the percentage of the core test results that fell within a defined range. If less than 90% of the results met MTO standards, the contractor's pay was reduced. Bonus pay was awarded if 95% or more of the edge compaction results satisfied standards. A review of these contracts revealed that bonus and full pay was easily obtained on the majority of contracts without any drastic changes made to construction operations. The incentives and disincentives motivated contractors to produce quality pavements that enhanced highway service life.

Based on the success of these contracts, MTO's Bituminous Section has drafted an end result specification (ERS), which would make incentives and disincentives for surface-course joint compaction a standard throughout Ontario for all paving contracts using over 15,000



tons of hot mix. This specification is currently in the final stages of approval and will be implemented this construction season if obtained.

The immediate trial results, obtained from testing core samples, revealed that no one method could be classified as superior. All test sections produced lane edges with exceptional compaction rates of 95% or more. The trials proved that contractors were fully capable of producing quality lane edges without the use of any additional equipment or new techniques. Follow-up investigations, conducted at four and six-year milestones,

For information, contact Pamela Marks, Bituminous Section, (416) 235-3724, or Pamela.Marks@mto.gov.on.ca

This initiative to implement a new specification for longitudinal joint compaction represents a progressive MTO effort to ensure the long-term quality and durability of Ontario's highways. •

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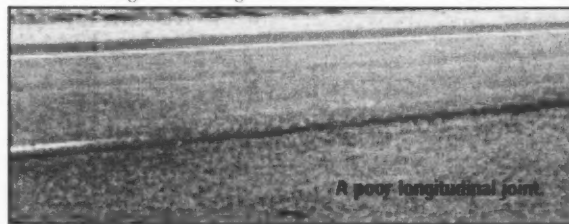
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compaction. The final test section used a combination of the Joint Match Heater™ and Joint Maker™ systems.

The immediate trial results, obtained from testing core samples, revealed that no one method could be classified as superior. All test sections produced lane edges with exceptional compaction rates of 95% or more. The trials proved that contractors were fully capable of producing quality lane edges without the use of any additional equipment or new techniques. Follow-up investigations, conducted at four and six-year milestones,

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